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T-778 P.002/016 F-032

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Toby SMITH

Application No.: 10/619,700

Filed: 07/14/2003

Title: Dual Side Mount Shock Resistant Piezoelectric  
Bender

Art Unit: 2646

Examiner: Huyen D. Le

Attorney Docket No.: P1721US01 (65925/05-356)

**APPELLANT'S REPLY BRIEF UNDER 37 C.F.R. §41.41(a)**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Pursuant to the requirements of 37 CFR § 41.37, this Reply Brief is submitted in response to the Examiner's Answer mailed November 15, 2006. The Examiner's Answer ("Answer") contained no new grounds of rejection and maintained the previous rejection of all claims. In response to the Examiner's Answer, Appellant hereby incorporates by reference and restates in its entirety all of Appellant's Substitute Brief under 37 CFR §41.37 filed August 21, 2006, which was previously presented by Appellant in this appeal. In addition, the following is Appellant's Reply to various new arguments made by the Examiner in support of his previous rejection.

\*\*\*\*\*

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Date: 1-12-07

Signature: Carol Welch

Carol Welch

**I. STATUS OF CLAIMS**

This application was filed on July 14, 2003 and claims the benefit of U.S. Provisional patent application Serial No. 60/477,668, filed June 11, 2003. The application as-filed contained Claims 1-22. Claims 8, 17, and 21 were canceled by applicant in a response filed February 1, 2005. Amendments were offered and accepted with respect to Claims 5 and 14 in this same filing. The amendment to Claims 5 and 14 changed the words "piezoelectric device" to "piezoelectric material" in these two claims. There have been no other claim amendments.

Additionally, applicant hereby cancels Claims 19, 20, and 22 without prejudice for purposes of the instant appeal.

Consequently, the only claims that remain for purposes of the instant appeal are 1-7, 9-16, and 18.

In his Answer, the Examiner indicated that the foregoing recitation of the Status of Claims was correct.

**II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Pursuant to the Examiner's Final Office Action mailed July 26, 2005 (the "Final Office Action"), the following is the sole ground for rejection presented for review in this appeal.

1. Claims 1-7, 9-16, 18-20, and 22 stand as rejected under 35 USC 103(a) as being unpatentable over Byrne (USPN 4,330,729) in view of Nakagawa (USPN 4,430,529).  
(Page 2 of the Final Office Action).

Please note that Claims 19, 20, and 22 have been withdrawn for purposes of the instant appeal and thus the rejection quoted above is moot with respect to those claims. Thus, only Claims 1-7, 9-16, 18, remain currently at issue.

In his Answer, the Examiner indicated that the foregoing recitation of the Ground of Rejection to Be Reviewed on Appeal was correct.

### III. ARGUMENT

All claims currently stand as rejected as being unpatentable over Byrne in view of Nakagawa. It is said that Byrne teaches mounting devices that are constructed of insulating material and positioned at the top and bottom of the metal diaphragm. It is further said that Byrne does not specifically teach mounting with adhesive, but that it is very well known in the art to provide an adhesive for fixing or connecting the mounting devices to the diaphragm. It is further said on page 3 of the Final Office Action that Nakagawa has been provided for the teaching of using an adhesive for securing the diaphragm to a support surface of a piezoelectric loudspeaker and not for modifying the structure of the Byrne loudspeaker.

Turning now to the first reason that Appellant felt compelled to file this Reply, Applicant respectfully contends that the Examiner is wrong in his assessment of the Nakagawa reference. More particularly, the passages cited in Nakagawa in support of the Examiner's position – and relied upon in the instant rejection – do *not* support the proposition that Nakagawa teaches the use of adhesive on both sides of the diaphragm for purposes of mounting it.

In support of Appellant's assertion, attention is directed to statements contained within the Answer that, as Appellant will demonstrate hereinafter, are clearly at odds with the actual content of Nakagawa (USPN 4,430,529). The statements complained of are found, respectively, on Pages 3, 4, and 5 of the Answer:

Page 3 of the Answer: "Nakagawa teaches an adhesive for connecting the mounting devices to the upper surface and lower surface of the diaphragm (col. 3, lines 29-31 and

59-66, col. 4, lines 42-44, and see figures 6-9)."

Page 4 of the Answer: "Nakagawa teaches an adhesive for connecting the mounting devices to the upper surface and lower surface of the diaphragm (col. 3, lines 29-31 and 59-66, col. 4, lines 42-44, and see figures 6-9)."

Page 5 of the Answer: "Nakagawa does teach the use of adhesive on both sides of the diaphragm (figures 6 and 9 and see col. 3, lines 61-63 and col. 4 lines 49-52)."

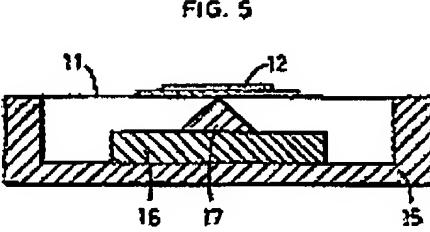
Appellant sincerely believes that the references cited in Nakagawa do *not* support the Examiner's arguments. As a consequence, the grounds for rejection asserted herein must fail and, as such, the instant application should be allowed to issue as a U.S. patent.

Each passage that has been relied upon in the Examiner's Answer will be examined in turn below.

1. Nakagawa at column 3, lines 29-31, does not – and cannot – teach the use of adhesive on both sides of the diaphragm to mount it because the embodiment described in this passage described is unambiguously mounted from a single side. In the Answer, the Examiner indicates that the text found in column 3 of Nakagawa at lines 29-31 support the proposition that adhesive can be used for affixing the mounting elements to both the upper and lower surface of the diaphragm.

The Appellant believes that the text relied upon does not – and cannot – support the asserted conclusion. In the table that follows, the Examiner's cited text is shown in context, with the specific language relied upon (lines 29-31) being indicated by underlining. The figure that

is referenced within the passage relied upon by the Examiner (i.e., Figure 5) has been placed within the right half of the table for easy reference.

Text from Nakagawa Column 3, lines 19-38	Related Figure
<p>Next, the second embodiment in FIG. 5 will be detailed.</p> <p>In this embodiment, a holder 16 of large mass is mounted on the inner surface of the bottom of a bottomed cylindrical frame 15, and a tapered support 17 is mounted on the holder 16 so that the tip of support 17 is positioned substantially at the center of an opening of frame 15. A diaphragm 11 stretched across said opening and a bending mode type piezoelectric diaphragm 12 is stuck to the center of diaphragm 11 by an adhesive or <u>the like</u>. <u>The central portion of diaphragm 11 is fixed substantially at a point to the tip of support 17 by the adhesive, thereby being kept stationary.</u> The vibration* mode, function, and effect, of the second embodiment are approximately similar to those in the first embodiment, thereby being omitted of details herewith. There is only a difference between the first and second embodiments, in that the holder 16 of large mass can effectively prevent transfer of vibrational energy to the frame 15.</p>	

\* The underlined text indicates the exact language relied upon by the Examiner in the Answer in support of the instant claim rejection.

As should be immediately clear by reference to Nakagawa's Figure 5, the embodiment described by this passage can only have adhesive applied to *a single side* of the diaphragm (i.e., the diaphragm 11 is affixed by adhesive to support 17). Quite simply, the cited text cannot possibly support the Examiner's assertion that Nakagawa discloses the use of adhesive on both sides to the mounting device because the embodiment of Figure 5 is mounted only from a single side.

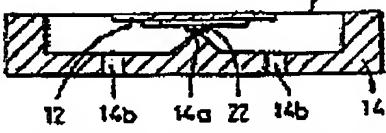
Additionally, please note that Appellant does not concede that the adhesive that is used to affix the diaphragm to support 17 is actually a "mounting" of the diaphragm as that term is used in the instant application (i.e., it is actually a "detuning" of the diaphragm). However, for purposes of this appeal only that usage will not be challenged.

As such, it is believed that the rejection of the Appellant's pending claims in reliance on the teachings of Nakagawa at column 3, lines 29-31 is improper and should be withdrawn.

**2. Nakagawa at column 4, lines 42-44, does not – and cannot – teach the use of adhesive on both sides of the diaphragm to mount it because the embodiment described in this passage is unambiguously mounted from a single side.**

In the Answer, the Examiner indicates that the text found in column 4 of Nakagawa at lines 42-48 supports the proposition that adhesive can be used for affixing the mounting elements to both the upper and lower surface of the diaphragm.

As before, the Appellant believes that the text relied upon does not – and cannot possibly – support the asserted conclusion. Note that Figure 8 (reproduced below) is once again a single sided embodiment and cannot provide support for the Examiner's contention that Nakagawa discloses the use of adhesives on *both* side of the diaphragm for mounting purposes. As before, the exact text cited by the Examiner is underlined.

Text from Nakagawa Column 4, lines 42-48	Related Figure
<u>In a fifth embodiment in FIG. 8, the piezoelectric diaphragm 12 is kept stuck by adhesive or pressurized by protuberance 14a at its central portion only from one*</u> side, which corresponds to the embodiment in FIG. 6 from which the frame 13 and elastic body 21 are omitted, where the diaphragm 11 is fixed to the edge of frame 14.	<b>FIG. 8</b> 

\* The underlined text indicates the exact language relied upon by the Examiner in the Answer in support of the instant claim rejection.

As if the clear message of Figure 8 was not enough, it should be noted that the associated text actually states that the diaphragm is stuck "only from one side."

As such, it is believed that the rejection of the Appellant's pending claims in reliance on the teachings in Nakagawa at column 4, lines 42-44 is improper and should be withdrawn and the instant case allowed to issue.

3. Nakagawa at column 3, lines 59-66 does not teach the use of adhesive on both sides of the diaphragm to connect it to the mounting devices. Similarly, the included passage at column 3, lines 61-63 does not teach the use of adhesive on both sides of the diaphragm to connect it to the mounting devices.

In the Answer, the Examiner contends that the text found in column 3 of Nakagawa at lines 59-66 and, more specifically, at column 3 lines 61-63, supports his proposition that adhesive can be used for affixing the mounting elements to both the upper and lower surface of the diaphragm.

Once again the Appellant believes that the cited passages do not support the Examiner's contention. The relevant passages (and associated figure) from Nakagawa are reproduced below, with the cited language being indicated by underlining (lines 59-66) and bold (lines 61-63).

Text from Nakagawa <b>Column 3, line 52, through Column 4 line 12</b>	Related Figure
<p>Next, a third embodiment in FIG. 6 will be detailed.</p> <p>This embodiment aims at reliably keeping tensioned or stationary the central portion of the aforesaid piezoelectric diaphragm 12, the means being cramp, sticking and pressurization, thereby preventing generation of noise caused by a shift of the central stationary point and enabling mass production of the loudspeakers.</p> <p><u>In detail, a bending mode type piezoelectric diaphragm 12 is stuck onto the center of a diaphragm 11 by an adhesive or the like and elastic bodies 21 and 22 are stuck onto the upper surface of diaphragm 11 and the lower surface of the piezoelectric ceramic plate at the central portions thereof respectively, the diaphragm 11 being tensioned and sandwiched between the pair of frames 13 and 14. The frame 13 at the sound radiation* side comprises a bottomed cylindrical member and has at the center of the bottom a tapered support protuberance 13a and at the portion except for the central portion a sound radiating bore 13b relatively larger. The frame 14 also comprises a bottomed cylindrical member and has a tapered support protuberance 14a at the central portion of the bottom and a plurality of small bores 14b surrounding the protuberance 14a, the protuberances 13a and 14a sandwiching therebetween under pressure the central portions of diaphragm 11 and piezoelectric diaphragm 12 through the elastic bodies 21 and 22, thereby keeping stationary the central portion of piezoelectric diaphragm 12 where the maximum amplitude occurs.</u></p>	<p style="text-align: center;">FIG. 6</p>

\* The underlined text indicates the exact language in lines 59-66 relied upon by the Examiner in the Answer in support of the instant claim rejection. Text in a bold typeface indicates lines 61-63.

Appellant has contended throughout the prosecution of this case that the above-cited text does *not* disclose mounting with adhesive from both sides of the diaphragm. The text associated with Figure 6 clearly indicates that the elastic bodies 21 and 22 are affixed with adhesive to the

upper and lower surface of the diaphragm. This attachment is not a mounting. Indeed, nowhere in Nakagawa is there an assertion or suggestion that the bodies 21 and 22 should be further affixed to the protuberances (13a and 14a), as would be required if adhesive is to be used to mount the diaphragm via attachment of the elastic bodies. The fact that adhesives are used to affix the elastic bodies to the diaphragm is no more significant for purposes of the instant invention than the fact that adhesive is used to attach the piezoelectric diaphragm 12 to the diaphragm 11.

As further support for this statement, please take note of the text at column 4, lines 23-27, wherein Nakagawa indicates that the adhesive that is used to affix the elastic bodies to the diaphragm is *optional*, and that the bodies might be held stationary by pressure alone. This provides still further support for Appellant's argument that this usage of adhesive is not for mounting purposes.

As such, Appellant believes that the specific text relied upon (Nakagawa at column 3, lines 59-66) does not support the Examiner's argument and that, for at least this reason, the instant rejection of all claims is inappropriate and should be withdrawn.

4. **Nakagawa at column 4, lines 49-52, does not teach the use of adhesive on both sides of the diaphragm to connect the mounting devices to the diaphragm.**

In the Answer, the Examiner indicates that the text found in column 4 of Nakagawa at lines 49-52 supports the proposition that Nakagawa discloses that adhesive can be used for affixing the mounting elements to both the upper and lower surface of the diaphragm.

As was discussed in connection with Point 4 above, Appellant has steadfastly contended throughout the prosecution of this case that affixing the elastic bodies to the diaphragm does not "mount" the diaphragm unless those bodies are further affixed to the protuberances.

Text from Nakagawa Column 4, lines 49 through 52	Related Figure
<p>A sixth embodiment in FIG. 9 provides two piezoelectric diaphragms 12 at both sides of diaphragm 11, elastic bodies 21 and 22 being stuck onto the central portions of piezoelectric diaphragms 12 respectively. In addition, the vibration mode, function, and effect, of the respective fourth, fifth and sixth embodiment are the same as those in the first embodiment and omitted of description.</p>	<p>FIG. 9</p>

- \* The underlined text indicates the exact language relied upon by the Examiner in the Answer in support of the instant claim rejection.

The arguments advanced by Appellant above are further applicable here and will not be repeated but, instead, incorporated by reference.

Additionally, please note once again that Appellant does not concede that the protrusions 13a and 14a are actually "mounts" as that term is used in the instant application. Consider, for example, the text at column 4, lines 28-33, wherein the protuberances are said to be screw-threaded to make them adjustable, thereby allowing the characteristic frequency of the loudspeaker to be varied (i.e., to "detune" the piezoelectric assembly, thereby giving a flatter frequency response).

In this example, Nakagawa discusses a case where two piezoelectric diaphragms 12 are affixed with adhesive to opposite sides of a diaphragm 11. Clearly, this use of adhesive is not "mounting" as that term is used within Appellant's application but instead merely recites the well-known fact that piezo electric elements are often affixed to the diaphragm (e.g., the Appellant's "bender assembly") with an adhesive. This has nothing at all to do with mounting the bender assembly.

As is explained above, the elastic bodies 21 and 22 are affixed to the diaphragms 12 with adhesive but are not affixed to the protuberances 13a and 14a and, as such, similarly cannot be considered to be use of adhesive for mounting purposes.

As such, Appellant believes that the specific text relied upon (i.e., Nakagawa at column 4, lines 49-52) does not support the Examiner's contention and that the instant rejection of all claims is inappropriate and should be withdrawn.

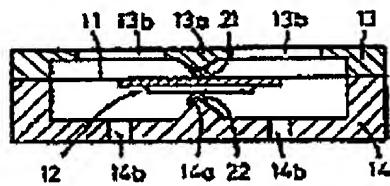
**5. Figures 6-9 of Nakagawa do not teach the use of adhesive on both sides of the diaphragm to connect the mounting devices to the diaphragm.**

In the Answer, the Examiner indicates that Figures 6-9 generally support the notion that adhesive can be used for affixing the mounting elements to both the upper and lower surface of the diaphragm.

Appellant would argue (and has argued *supra*) the contrary. As has been noted previously, Figure 8 of Nakagawa cannot possibly provide support for using adhesive on both sides of a diaphragm to mount it because it is mounted from a single side.

With respect to the remaining figures (Figures 6, 7, and 9), Figure 7 (which has not been discussed heretofore in this Reply) the elastic bodies 21 and 22 are described as having been created by coating the tips of the protuberances 13a and 14a with an elastic material (col. 4, lines 34-41).

FIG. 7



Further, Nakagawa goes on to say that the elastic bodies 21 and 22 are absolutely *not* further affixed to the diaphragm with adhesive:

Namely, elastic bodies 21 and 22 are formed of elastic material coated on the tips of support protuberances 13a and 14a, and sandwich under pressure the central portions of the diaphragm 11 and piezoelectric diaphragm 12.

That is, Nakagawa makes clear that in this instance the elastic bodies – in combination with the protuberances 13a and 14a – hold the diaphragm in place by tension alone at the anti-node (i.e., a point of maximum deflection).

As such, Appellant believes that none of Nakagawa's Figures 6-9 – either individually or in combination – which have been relied upon by the Examiner in formulating the instant rejection of all of Appellant's claims, do not support his position. As such, the instant rejection of all claims is inappropriate and should be withdrawn.

#### 6. The teachings of Nakagawa are inapplicable to Byrne.

Finally, the Examiner has indicated that Byrne and Nakagawa references have not been combined but rather Nakagawa has been provided for the purpose of teaching the use of adhesives in connection with piezoelectric devices:

Responding to the arguments about the combination of Byrne in view of Nakagawa, the examiner has explained in the Grounds of rejection. Further, the Examiner has provided the Nakagawa reference for the teaching of using the adhesives for better supporting the mounting devices to the upper and lower surfaces of the diaphragm of Byrne. The Examiner has not combined the Nakagawa reference for modifying the structure of the Byrne loudspeaker.

Answer at p. 5.

The Examiner argues that Nakagawa has been provided as an example of a prior art reference that illustrates the use of adhesives on the upper and lower surfaces of the diaphragm to mount it. Appellant disputes this fact as has been discussed previously.

That being said, the Appellant further disputes that Nakagawa was properly applied to Byrne. Assuming *arguendo* that the Examiner is correct in his interpretation of the teachings of Nakagawa, in Appellant's view the Examiner has suggested modifying Byrne in a way that is antithetical to the goal of his invention. As such, Appellant believes that the teachings of Nakagawa have been misapplied to Byrne.

By way of explanation, Byrne's focus is on the creation of a piezoelectric device that can be "rapidly and easily assembled with a high degree of accuracy", Col. 2, lines 2-4. *Accord:* Col. 5, lines 51-60. This stated goal is clearly at odds with Byrne's view of the prior art use of adhesives (on a single side) of a piezoelectric device which is described by Byrne as utilizing a "rubber-like cement which requires a period of time for curing." This is, of course, antithetical to his goal of rapid and easy assembly.

Thus, Appellant believes that – even assuming that Nakagawa has been correctly interpreted – the Examiner's application of this teaching to Byrne is misplaced. Applying a reference that utilizes adhesives (in a different context) to another that acknowledges – but rejects – the use of same is simply a misapplication of the prior art.

As a consequence, it is believed that the current rejections all claims in this application should be withdrawn and the instant application allowed to issue.

#### IV. CONCLUSION

Appellant has met all of the requirements of patentability and it is therefore respectfully requested that the rejection of Appellant's Claims 1-7, 9-16, and 18 be withdrawn and that these claims be allowed to issue.

Respectfully Submitted,

1/12/06  
Date

  
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